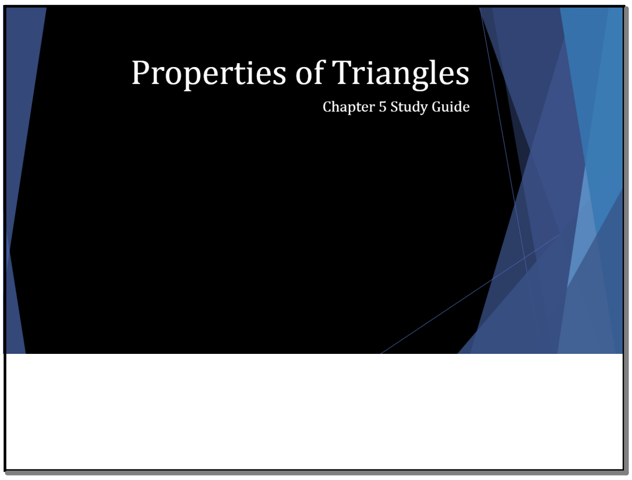
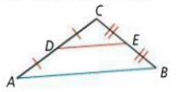

Properties of Triangles
Chapter 5 Study Guide

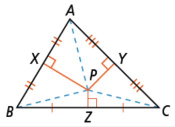

Learning objectives
I can identify parts of triangles and use the properties to solve problems.

A **midsegment** joins the midpoints of two sides of a triangle, is parallel to the third side and is half the length of the third side.

If . . .	Then . . .
D is the midpoint of $\overline{CA}$ and E is the midpoint of $\overline{CB}$	$\overline{DE} \parallel \overline{AB}$ and $DE = \frac{1}{2}AB$



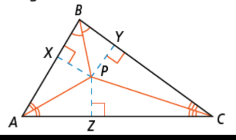
Perpendicular bisectors: lines or segments that bisect another line or segment at a 90° angle.

Diagram	Symbols
	Perpendicular bisectors $\overline{PX}$, $\overline{PY}$, and $\overline{PZ}$ are concurrent at P. $PA = PB = PC$

The perpendicular bisectors of the sides of a triangle are concurrent at a point *equidistant* from the vertices. This point is called the *circumcenter*. It can be inside, on or outside the triangle.

Angle bisectors are segments that bisect an angle. Every point on an angle bisector is equidistant from the sides of the angle (triangle).

Diagram



Symbols

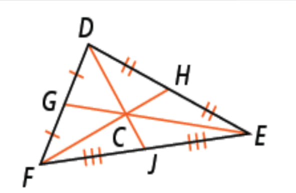
Angle bisectors $\overline{AP}$, $\overline{BP}$, and $\overline{CP}$ are concurrent at P.

$PX = PY = PZ$

The bisectors of the angles of a triangle are concurrent at a point *equidistant* from the sides of the triangle. This point is known as the *incenter*. It is always inside the triangle.

Triangle *medians*: segments that start at a midpoint and end at the opposite vertex.

The medians of a triangle are *concurrent* at a point that is 2/3 the distance from each vertex to the midpoint of the opposite side.



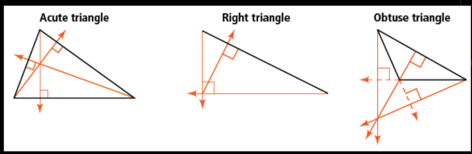
$DC = \frac{2}{3}\, DJ$

$EC = \frac{2}{3}\, EG$

$FC = \frac{2}{3}\, FH$

In a triangle, the point of concurrency of the medians is the **centroid** of the triangle.

The *altitude* of a triangle is a perpendicular line segment drawn from the vertex to the opposite side. It can be inside, outside or one of the sides of the triangle.



The altitudes of a triangle are concurrent at the **orthocenter** of the triangle. The orthocenter of a triangle can be inside, on, or outside the triangle, just like the altitudes that create it.

Summary